AGENDA ITEM V

PROPOSED NEW ACADEMIC/RESEARCH CENTER

LOUISIANA STATE UNIVERSITY AND A&M COLLEGE

CENTER FOR COMPUTATION AND TECHNOLOGY (CCT)

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BACKGROUND INFORMATION

Board of Regents <u>Guidelines: Proposed Centers, Institutes, and Other Similar Academic/ Research Units</u> provide two different procedures for reviewing new academic/research units based on their projected sources of funding. For units to be supported by state funds, such as the one proposed, the sponsoring institution is required to submit a full proposal; the Board of Regents shall then consider a term of approval based in part on the extent and stability of available funding. LSU A&M requests full (i.e., five-year) approval for the proposed center.

Quotations from the institution's proposal appear in italics below.

STAFF ANALYSIS

1.   Description/Mission

Indispensable for facilitating research and commerce, the development of computing and network infrastructure (such as LONI) also make new *methods* of computing possible. In turn, new methods of computing create new opportunities for research. One example is distributed ("clustered" or "grid") computing, which can involve the concerted operation of tens of thousands of computers, all of which could be focused on modeling and solving a single problem. Grid computing gives rise to new questions and lucrative opportunities: What problems can this new technology help to solve? How will such computational focus occur? What new software applications need to be created? What can be done with it?

The Center for Computation and Technology (CCT) at LSU is a potent answer to such questions. For years, LSU has been using a portion of its state <u>Vision 2020</u> IT Initiative funds to acquire and maintain SuperMike, a clustered supercomputer. According to the standard international benchmark, SuperMike is among the fastest computers in the world, performing over 2 trillion computations per second. According to the same ranking, it is currently the third fastest supercomputer located at an academic institution in the world.[1]

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[1] Subject to change.

LSU's computing facilities are clearly an enormously powerful platform for research and development.

SuperMike is at the center of the CCT and will serve as a major instrument in advancing the center's broad mission:

- Provide the IT platform and leadership for transforming economic development in Louisiana
- Serve as the focal point to develop and use innovative technologies
- Advance the level of research across the state
- Foster interdisciplinary programs that connect the arts, engineering, sciences, and humanities
- Prepare students and faculty for new challenges of the 21st century

The CCT will be an interdisciplinary entity made up of associate faculty, other academic departments, and at the national and international level, other universities, industries, and government agencies.

7. Faculty

The proposal states that the "CCT is using its Vision 2020 IT funds to support more than thirty new faculty positions with research groups in advanced technologies and computational sciences." Areas of faculty research include:

- grid programming and grid portals
- high-speed digital network switching devices
- large-scale simulations of complex systems (e.g., relativistic astrophysics, gravity/black holes, turbine cooling flows, ubiquitous monitoring systems, coastal erosion)
- numerical relativity
- nano-scale engineering, microchip development
- genomics (e.g., modeling the structural effects of sequence variations)
- medical informatics
- auditing, accounting information systems
- software design
- psychoacoustics, digital signal processing, computer music applications, animation

Other faculty at LSU also participate; some have been granted seed monies (portions of start-up packages) to pursue research in Mathematics, Civil & Environmental Engineering, Physics & Astronomy, Industrial Manufacturing & Systems Engineering, Mechanical Engineering, Biological & Agricultural Engineering, and Geology & Geophysics.

Faculty research in the CCT is organized into five general areas:

- a. Core IT
- b. Business
- c. Computational Biology
- d. Materials Science and Engineering

e.   Laboratory for Creative Arts and Technologies (L-CAT)

Special mention must be made of the team working under Dr. Edward Seidel, the CCT's Director. Dr. Seidel's team is developing software applications which will enable researchers world-wide to use ultra-high bandwidth networks, such as the TeraGrid, more effectively:

> *Edward Seidel has assembled a unique research and applications development team with world renown in the areas of computational software frameworks, grid computing, collaborative environments, and numerical relativity. These projects are presently funded with substantial support from the European Commission, the German DFN-Verein, Max Planck, Microsoft, and the American NSF and DOE. Building on this work, large-scale, multi-million dollar, interdisciplinary projects are expected to be submitted from CCT to NSF, DOE, NASA, and other agencies beginning in 2004.*

According to the proposal, the Board of Regents' recent approval to support the establishment of LONI is a critical step toward ensuring that the CCT has the hardware/network resources it needs to position Louisiana in the very forefront of next-generation IT development world-wide:

> *Activation of a Louisiana high-bandwidth network will allow CCT faculty and researchers to develop IT research and applications on the nation's extended TeraGrid, as well as on a multi-institutional university basis in Louisiana.* CCT's applications development capacity is unique to Louisiana because the assembled CCT research team is regarded as the best, both nationally and internationally. *In addition to increasing the research prowess of Louisiana universities, CCT's applications development capacity affords Louisiana high-technology employers and manufacturers a pre-eminent competitive edge* (staff emphasis).

Faculty are also involved in educational and community outreach. A visitors program has brought in visiting researchers. The LCAT Scholar-In-Residence program is helping departments develop graduate concentrations in Digital Media Arts and Sciences. As far as community outreach, CCT has conducted meetings with state leaders in economic development, and several LCAT-related initiatives listed below reach Baton Rouge youths and the wider community:

- The Digital Media Arts Summer Camp Program for K-12 students and teachers
- The Digital Arts Studio at the new Shaw Center for the Arts (a new downtown arts complex)
- The Redstick Animation Festival
- Collaboration with the Baton Rouge Community School for the Arts

Far from being ancillary to the CCT's mission, these initiatives work directly to create "a culture of creativity and high technology that supports a vibrant quality of life... This, in turn, helps future LSU graduates look at Baton Rouge as a viable place to live, start a business, or otherwise contribute to the economic growth and vitality of the region and state."

3. Facilities and Equipment

LSU's investments in facilities and equipment are presented briefly by year:

FY 2001-02   95% of $6.975 million (IT Initiative) spent on acquiring SuperMike, renovations, network upgrades (to Gigabit bandwidth for IP, H.323 video protocol), startup-seed funding for equipment and research

FY 2002-03   82% of $9 million (IT Initiative) spent on the above, and on partially finishing 3rd floor of Frey Building as CCT headquarters

FY 2003-04 $1.025 million (IT Initiative) set aside to renovate Johnston Hall (floors 2 and 3) for expanded faculty, researcher, and staff operations

FY 2004-05   No figure stated. "CCT plans to complete finishing out the 3rd floor, Frey Building, and design, construct, and equip a world-class visualization laboratory on this floor. In terms of technology equipment, CCT's top priority is sustaining its supercomputing capacity in the top ten nationally."

4. Administration

The CCT will be directed by Dr. Edward Seidel, a physicist recognized world-wide for his expertise in high-performance computing. Dr. Seidel "is responsible for all activities of the center, including approval of research programs, partnerships, communications, and public relations" and will report directly to the Vice Chancellor for Research and Graduate Studies and to the CCT Executive Committee. The latter group is composed of LSU's Chancellor, Executive Vice Chancellor and Provost, Vice Chancellor for Research and Dean of the Graduate School, and the deans of the colleges of Business Administration, Engineering, and Basic Sciences.

5. Budget

Estimated expenditures are reported as follows:

Estimated Expenditures (in thousands)	Year 1	Year 2	Year 3	Year 4	Year 5
Administration	971	1,179	2,262	3,586	3,783
Faculty	1,290	1,431	2,262	3,586	4,161
Support Personnel	862	1,179	1,922	3,586	4,161
Graduate Fellows/Assistants	809	842	1,357	2,151	2,270
Facilities	1,139	2,000	2,000	2,000	2,000
Equipment	1,135	1,179	1,357	1,793	1,892
Supplies	105	168	227	538	567
Travel	254	33	457	600	600
Start-ups/Seed Support	2,438	1,684	904	1,488	881
Sponsored Programs/Events	516	421	565	600	600
Total	**$ 9,519**	**10,116**	**13,313**	**19,928**	**20,921**

Current revenue is shown below:

Current Revenue (in thousands)	Year 1	Year 2	Year 3	Year 4	Year 5
LSU Operating Budget	9,769	9,000	9,000	9,000	9,000
Federal Grants, Contracts	1,400	2,100	4,900	6,300	7,000
State Grants, Contracts		140	175	175	175
Submissions to G-U-I Partners	350	1,400	2,100	3,500	4,900
Total	**$ 11,519**	**12,640**	**16,175**	**18,975**	**21,075**

Pending revenue is shown below:

Pending Revenue (in thousands)	Year 1	Year 2	Year 3	Year 4	Year 5
Submissions to Federal agencies (approx.)	2,000	3,000	7,000	9,000	10,000
Submissions to State opportunities	-	200	250	250	250
Submissions to G-U-I Partners	500	2,000	3,000	5,000	7,000
Total	**$ 2,500**	**5,200**	**10,250**	**14,250**	**17,250**

STAFF SUMMARY

The staff agrees that the CCT has superlative leadership, faculty, and resources. Expectations that the CCT will be greatly beneficial to the state are reasonable. Prospects for external funding are excellent. The staff recommends full approval.

STAFF RECOMMENDATION

The staff recommends that the Academic and Student Affairs Committee grant full, five-year approval for the proposed Center for Computation and Technology at LSU A&M, effective immediately. Given that projected costs exceed existing revenues in Year 4, an implementation report to the Commissioner of Higher Education describing the Center's activities and financial status shall be due January 15, 2007.